



Oil and Gas Developments in Pennsylvania in 1967

William S. Lytle
Louis Heyman
Walter R. Wagner

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF INTERNAL AFFAIRS
John K. Tabor, Secretary
BUREAU OF
TOPOGRAPHIC AND GEOLOGIC SURVEY
Arthur A. Socolow, State Geologist

PAEN 111 STATE LIBRARY
COMPLETION SECTION

JAN 7 1968



Digitized by the Internet Archive
in 2016 with funding from

This project is made possible by a grant from the Institute of Museum and Library Services as administered by the Pennsylvania Department of Education through the Office of Commonwealth Libraries

Oil and Gas Developments in Pennsylvania in 1967

By William S. Lytle, Louis Heyman,
and Walter R. Wagner

PENNSYLVANIA GEOLOGICAL SURVEY
FOURTH SERIES
HARRISBURG

1968

Copyrighted 1968
by the
Commonwealth of Pennsylvania
Quotations from this book may be published if credit is given to
the Pennsylvania Geological Survey

ADDITIONAL COPIES
OF THIS PUBLICATION MAY BE PURCHASED FROM
CAPITOL BOOK STORE, ROOM 54, MAIN CAPITOL BUILDING
HARRISBURG, PENNSYLVANIA 17125

CONTENTS

	<i>Page</i>
Abstract	1
Introduction	2
Acknowledgments	4
Shallow-sand exploration and development	7
Shallow-sand oil and gas developments	7
Deep-sand exploration and development	14
Elk Run field	15
Devonian resource studies	16
Current activity	24
Articles on Pennsylvania geology, 1967	25

ILLUSTRATIONS

FIGURES

	<i>Page</i>
FIGURE 1. Annual production of natural gas in Pennsylvania ...	3
2. Graph showing shallow-well activity, 1950-1967.....	7
3. Columnar section showing shallow oil and gas sands of western Pennsylvania	10
4. Annual production of crude oil in Pennsylvania.....	12
5. Crude oil production curve of the Bradford District, Pennsylvania and New York	12
6. Crude oil prices, production, and well completions, Bradford field	13
7. Annual rate of deep-sand exploration and develop- ment	16
8. Stratigraphy of the Minard Run Oil Co. no. 1 well	17
9. Well location map, 1967	18
10. Elk Run field map	20

TABLES

	<i>Page</i>
TABLE 1. Deep and shallow well completion summary, Pa., 1967	4
2. Production in Pa., 1967	4
3. Discoveries in Pa., 1967	5
4. Exploration failures in Pa., 1967	6
5. Shallow-sand well completions in Pa., 1967	8
6. Shallow-sand wells deepened in Pa., 1967	9
7. Oil wells and crude oil production in Pa. by counties, 1966, 1967	11
8. Crude oil prices, 1967	11
9. Summary of deep well completions in Pa., 1967	14
10. Deep gas production in Pa., 1967	27
11. Summarized records of deep wells drilled in Pa., 1967	31
12. Summarized records of deep wells drilled in Pa., 1966 (records received in 1967)	38

OIL AND GAS DEVELOPMENTS IN PENNSYLVANIA IN 1967

**By William S. Lytle,
Louis Heyman and Walter R. Wagner**

ABSTRACT

Exploratory drilling in Pennsylvania in 1967 resulted in the discovery of one new Oriskany gas pool (Chickaree pool in the Rager Mt. field, Cambria County), one new Upper Devonian gas field (Keating, Clinton County), and in Indiana County an extension of an Upper Devonian gas pool.

Development drilling continued in the Youngsville-Sugar Grove oil field of Warren County with completion of 62 Glade sand oil wells. In the Sanford field 13 new oil wells in the Venango Group were productive; in the Pleasantville-Pithole area 11 oil wells were completed in the Red Valley sand. In Indiana and Jefferson Counties 47 gas wells were drilled in the Marchand field and 30 gas wells in the Big Run field. Operators continued to develop the deep-sand fields in Erie and Crawford Counties, where 34 Medina gas wells were completed, and in the Elk Run field, Jefferson County, where 14 Oriskany gas wells were completed.

There were 697 new wells drilled and 22 wells deepened during 1967. Of the 719 new and deepened wells, 661 were in proven fields and 58 were exploratory tests. Of the 661 proven field wells, 600 were drilled for primary recovery, 57 for secondary recovery projects, 3 for stratigraphic tests and 1 as a miscellaneous test. Of the 600 primary development wells, 258 were oil wells, 297 were gas wells and 45 were dry holes.

The 58 exploratory tests drilled a total of 180,944 feet of hole. Of the 58 tests, 21 were successful and 37 were dry, for a success ratio of 1 in 1.8. The total footage drilled during the year was 1,569,717 feet.

Crude oil production during 1967 amounted to 4,387,000 barrels; an increase of 1.2 percent over the 1966 production of 4,337,000 barrels. Proved oil reserves as of December 31, 1967 were estimated at 63,289,000 bbls (barrels). Natural gas produced totaled 89,966,000 Mcf (thousand cubic feet) as compared with 91,365,000 Mcf in 1966. Gas reserves were estimated at 1,392,170,000 Mcf at the end of the year. Gas stored in Pennsylvania's reservoirs on December 31, 1967 was 490,387,000 Mcf; this amount is included in the above reserve figure. Natural gas liquids produced in 1967 amounted to 73,000 bbls.

Seismic activity in the Commonwealth declined to 17 crew weeks from 68 crew weeks in 1966.

INTRODUCTION

The 1967 oil and gas developments in Pennsylvania are summarized in this publication. The deep-well skeletal logs (those which reached rocks of Middle Devonian age or older) are shown in Table 11. Deep-well skeletal logs of wells drilled in 1966, whose logs were not available until 1967, are shown in Table 12. For those deep wells drilled prior to 1950, the skeletal logs and other information on the Commonwealth's oil and gas activities are to be found in Bulletin M 31. Similar information for the 1950 to 1954 period was published in Bulletin M 39 and for the 1955 to 1959 period in Bulletin M 45. For the years 1960 through 1966 this information was published annually in Progress Reports 158, 160, 165, 166, 168, 172, and 173 of the Pennsylvania Bureau of Topographic and Geologic Survey. Oil and gas developments in the shallow sands (Upper Devonian or younger) are described in Bulletin M 45 and Progress Reports 135, 139, 143, 144, 147, 150, 151, 154, 155, 157, 158, 160, 166, 168, 172, and 173.

A list of deep-well samples on file with the Survey was published in the Survey's "Catalogue of Deep-Well Samples" (Information Circular 16). Supplemental lists were published in Progress Reports 157, 158, 160, 165, 166, 168, and 173. Many shallow-well samples are also on file with the Survey. A list of the shallow-well samples will be published in the near future.

Deep-well drilling in 1967 was down 55 percent from 1966. Of the 67 deep wells drilled during the year, 14 were exploratory and 53 were development. Crawford County in northwestern Pennsylvania had the greatest density of deep drilling with 23 completions during the year while Jefferson County had 19 and Erie County had 13.

Drilling activity in 1967 in the shallow sands of western Pennsylvania increased 8 percent over 1966 despite restrictions imposed by the crude oil refiners during the last three months of the year. There were 630 shallow-sand wells drilled and 22 wells deepened during 1967.

The price of Pennsylvania grade crude oil in the three producing districts remained constant during the year. (See Table 8) Crude oil and natural gas production and reserves are shown in Table 2. Natural gas liquids produced in 1967 were 73,000 bbls. The natural gas and natural gas liquids figures are those published by the American Gas Association whereas the crude oil figures source is the American Petroleum Institute.

A classification of the wells drilled in 1967 exclusive of those drilled for gas storage and secondary recovery purposes is given in Table 1. Figure 1 shows the annual gas production in the State since 1882. The 1967 discoveries are listed in Table 3 and the dry exploratory tests are shown in Table 4. (See Figure 9 for their locations)

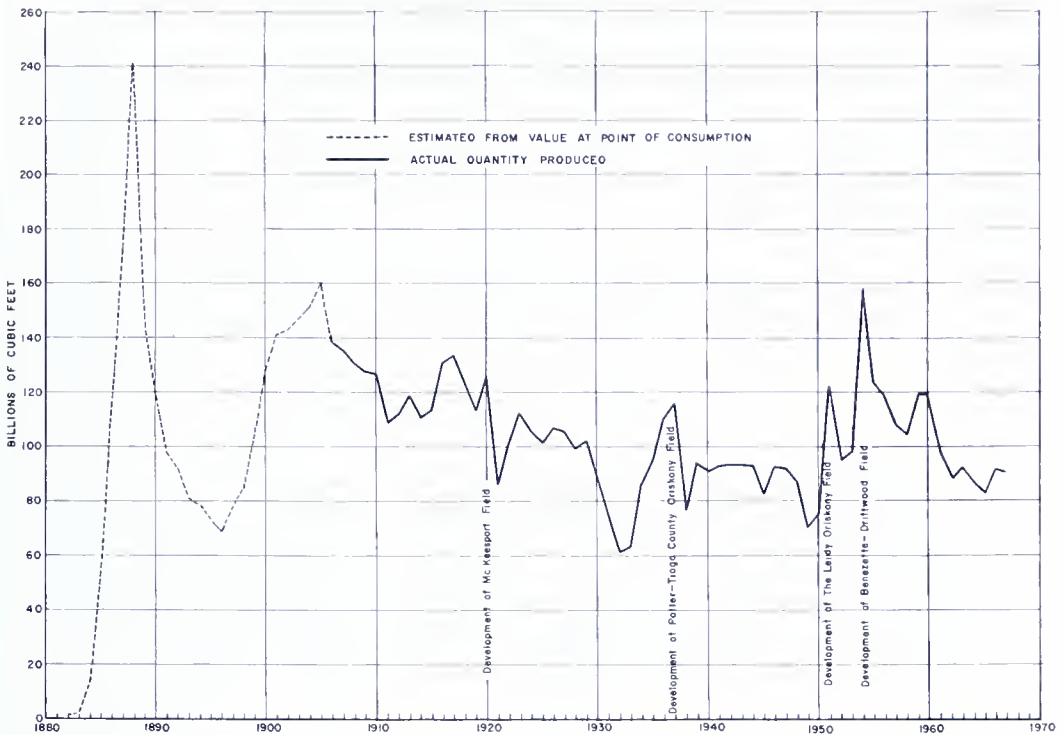


Figure. 1. Annual production of natural gas in Pennsylvania.

A total of 1,569,717 feet was drilled in 1967. This total may be subdivided into 1,290,337 feet of development footage, 180,944 feet of exploratory footage, and 98,436 feet representing service wells, and other tests. Of the 1,569,717 feet, 1,214,167 feet is shallow-well footage and 355,550 feet is deep-well footage.

The Pennsylvania Game Commission leased Tracts 174 A-1 and 174 A-2 at a royalty bid of \$.04 per Mcf of gas and a rental of \$5.00 per acre on a total of 283 acres. At the end of 1967 they had 29 active leases totaling 9,891 acres. Twenty-six wells were producing on 15 of these leases. A total of 3 new wells were drilled on Game Commission lands during the year.

At the end of the year there were 126,576 acres of Pennsylvania Department of Forests and Waters lands under lease for oil and gas exploration and development including 59,109 acres of gas storage. In 1967, rental and royalty payments from oil and gas leases on State Forest lands totaled \$374,085. Royalty payments through December 31, 1967 amounted to \$202,836 for 2,164,627,000 cubic feet of gas. Rental payments for the same period totaled \$171,249 for undeveloped leases, gas storage, pipeline rights of way, and compressor and pumping stations.

Table 1. *Deep and shallow well completions
summary Pennsylvania, 1967**

<i>Completions</i>	<i>Oil</i>	<i>Gas</i>	<i>Dry</i>	<i>Total</i>	<i>Percent Successful</i>
Exploratory tests	11	10	37	58	37
Development wells	258	297	45	600	92
	269	307	82	658	87

* Does not include wells drilled in connection with underground gas storage or service wells.

Through competitive bidding 4,531 acres were leased for oil and gas exploration at a total bonus of \$13,006. These tracts carry a yearly rental of \$1.00 per acre and a royalty of \$.04 for each thousand cubic feet of gas produced. One dry hole was drilled on State lands during the year.

Seismic-crew weeks declined from 68 in 1966 to 17 in 1967.

Table 2. *Production in Pennsylvania, 1967*

	<i>1966</i>	<i>1967</i>	<i>Cumulative total to 12/31/67</i>	<i>Reserves 12/31/67</i>
Oil (bbls)	4,337,000	4,387,000	1,256,828,000	63,289,000*
Gas (Mcf)	91,365,000	89,966,000	8,282,500,000	1,392,170,000**

*Corrected

**Includes 490,387,000 Mcf in storage

ACKNOWLEDGMENTS

In the preparation of this review, the writers acknowledge the cooperation of the Bradford District Producers Association and the following Commonwealth agencies: Game Commission, Department of Forests and Waters, and the Department of Mines and Mineral Industries.

Table 3. — Discoveries in 1967, Pennsylvania

Map No.	County	Operator Well No. and Lease	Compl. Date mo./day	Basis for Location	Total Depth (Ft.)	Name of Formation at TD	Prod. Depth (Ft.)	Producing Formation or Zone	Initial Daily Prod.	Field or Pool Name	Explor. Class.	Remarks
2	Cambria	Peoples Natural Gas Company 1 Griffith	10/ 9	Sub. Geol. Seismic	8,100	Helderberg	8,035	Oriskany	5,000 Mcf	Chickaree	NPD	Dis. on separate fault block, Rager Mt. field, Laurel Hill anticline.
70	Clinton	Richmond et al 1-A Donnelly	2/16	Sub. Geol.	1,085	Upper Devonian	1,019	Upper Devonian	597 Mcf	Keating	NFD	West Flank Laurel Hill anticline
73	Indiana	Mid Atlantic Oil & Gas Co. 1 Watson	6/ 7	Sub. Geol.	3,581	Bradford	3,168	Balltown	200 Mcf	Crete	EXT	Extended Crete field to southwest

Table 4. — *Exploratory failures in 1967, Pennsylvania*

Map No.	County	Operator Well No. and Lease	Compl. Date mo./day	Basis for Location	Total Depth (Ft.)	Name of Formation at TD	Explor. Class. or Field	Remarks
69	Beaver	J. Shivler 2 Shivler	10/ 3	Sub. Geology	1,315	Berea	NFW	
71	Elk	Sylvania Corporation	3/ 7	Sub. Geology	1,853	Kane	NFW	East flank Hebron anticline
72	Indiana	S. J. Kerpoe 1 Shirley	3/ 9	Sub. Geology	3,911	Bradford	EXT	Limited Elders Ridge field to NE'
74	Indiana	L. H. Foehrenbach 1 Foehrenbach	11/ 9	Sub. Geology	3,100	Balltown	EXT	Chestnut Ridge anticline
41	Jefferson	Consolidated Gas Supply Corp. 1 E. A. Haddow	2/28	Sub. Geology	7,783	Helderberg	EXT	Limited Elk Run field to NE
61	Somerset	Peoples Natural Gas Company 1 T. C. Sipe	1/31	Seismic Sub. Geology	9,305	Oriskany	NFW	West flank Negro Mountain anticline
75	Warren	M. D. M. Oil Company 1 Hammernill Company	4/18	Sub. Geology	633	Venango Group	NFW	
64	Washington	S. W. Jack 1 W. O. Anderson	1/11	Sub. Geology	5,895	Helderberg	NFW	
67	Westmoreland	James Drilling Corporation 1 High Ridge Company	1/16	Seismic Sub. Geology	7,937	Helderberg	NPW	Laurel Hill anticline
68	Wyoming	Otis Eastern, Incorporated 1 E. Swintak	3/ 9	Sub. Geology	4,999	Upper Devonian	NFW	Northeastern Pennsylvania

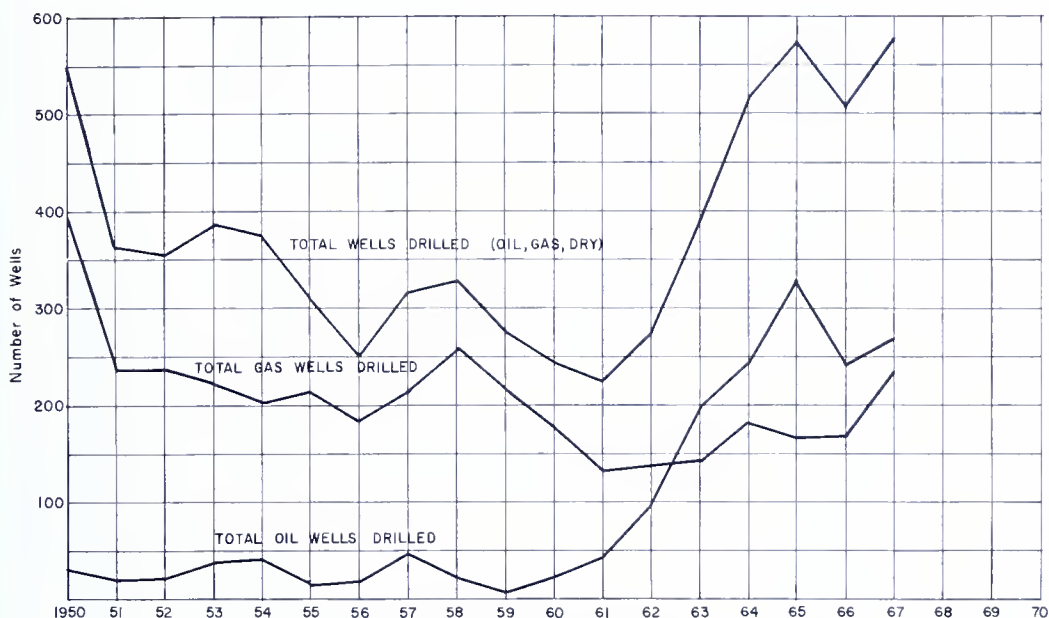


Figure 2. Graph showing shallow-well activity, 1950-1967.

SHALLOW-SAND EXPLORATION AND DEVELOPMENT

During 1967 a total of 652 shallow wells were drilled in the Commonwealth. Of the 652 shallow wells there were 269 oil wells, 233 gas wells, 67 dry holes, 57 service wells, 22 wells drilled deeper, 3 stratigraphic tests, and 1 miscellaneous well. These wells comprised 1,214,167 feet of hole. Figure 2 is a graph showing the number of shallow wells drilled between 1950 and 1967. Table 5 lists the shallow-sand primary well completions in Pennsylvania. Table 6 shows the results of deepening 22 shallow wells in 1967. The generalized stratigraphic positions of the productive oil- and gas-producing sands in western Pennsylvania are shown in Figure 3.

SHALLOW-SAND OIL AND GAS DEVELOPMENTS

Oil production in Pennsylvania averaged 12,019 BOPD (barrels of oil per day) in 1967 as compared with 11,880 BOPD in 1966. The total oil production for Pennsylvania during the year was 4,387,000 BO or 50,000 BO more than the total oil production of 1966. The daily average production for the Pennsylvania portion of the Bradford field was 6,918 BOPD in 1967 as compared with 7,085 BOPD in 1966. In the Middle and Southwestern Districts of Pennsylvania the daily average production

Table 5. — *Shallow-sand well completions in Pennsylvania, 1967**

	TOTAL			GAS			OIL			DRY		
	No. of Wells	Aver. Total Depth (feet)	No. of Wells	Aver. Init. Open-Flow (MCFPD)	Aver. Total Depth (feet)	No. of Wells	Aver. Init. Production (BOPD)	Aver. Total Depth (feet)	No. of Wells	Aver. Total Depth (feet)	No. of Wells	Aver. Total Depth (feet)
Allegheny.....	1	2,662	1	502	2,662	....	....	....	....	....	....	....
Armstrong.....	27	2,332	23	666	2,370	....	....	....	4	2,113	4	2,113
Beaver.....	1	1,315	....	....	....	....	....	....	1	1,315	....	....
Butler.....	4	896	4	57	896	....	....	....	....	....	....	....
Clarion.....	11	1,422	4	59	1,865	5	6	1,171	2	1,161	....	....
Clearfield.....	6	3,120	6	1,730	3,120	....	....	....	....	....	....	....
Clinton.....	2	1,763	2	351	1,763	....	....	....	....	....	....	....
Elk.....	20	2,011	10	213	2,690	6	9	1,748	4	2,016	....	....
Forest.....	8	909	....	....	....	8	11	909	....	....	....	....
Greene.....	10	1,165	3	122	1,114	3	4	538	4	1,666	....	....
Indiana.....	129	3,490	115	819	3,465	....	....	....	14	3,742	....	....
Jefferson.....	43	2,881	42	3,265	2,666	....	....	....	1	3,205	....	....
Lawrence.....	3	725	....	....	....	1	2	965	2	605	....	....
McKean.....	75	1,722	6	1,201	1,714	64	5	1,712	5	1,860	....	....
Potter.....	1	1,328	....	....	....	1	10	1,328	....	....	....	....
Venango.....	42	816	....	....	....	34	15	836	8	728	....	....
Warren.....	160	823	....	....	....	147	22	863	13	891	....	....
Washington.....	4	2,810	2	114	2,699	....	....	....	2	3,560	....	....
Westmoreland.....	21	3,248	15	1,089	3,143	....	....	....	6	3,511	....	....
Wyoming.....	1	4,999	....	....	....	....	....	....	1	4,999	....	....
TOTAL.....	569	2,128	233	1,536	3,915	269	20	1,083	67	2,501	....	....

*Does not include wells drilled in connection with underground gas storage or service wells.

Table 6. — *Shallow-sand wells deepened in Pennsylvania, 1967**

TOTAL			GAS			OIL			DRY		
No. of Wells	Aver. Amt. Deepened (Feet)	No. of Wells	Aver. Init. Open-Flow (MCFPD)	Aver. Amt. Deepened (Feet)	No. of Wells	Aver. Init. Production (BOPD)	Aver. Amt. Deepened (Feet)	No. of Wells	Aver. Amt. Deepened (Feet)	No. of Wells	Aver. Amt. Deepened (Feet)
Armstrong	3	246	3	926	246	.....	.....	.....	.....	.....	.....
Butler	4	896	4	57	896	.....	.....	.....	.....	.....	.....
Fayette	1	1,240	1	40	1,240	.....	.....	.....	.....	.....	.....
Greene	2	626	2	119	626	.....	.....	.....	.....	.....	.....
Indiana	8	1,278	8	664	1,278	.....	.....	.....	.....	.....	.....
Jefferson	1	3,308	1	1,500	3,308	.....	.....	.....	.....	.....	.....
Westmoreland	3	728	2	618	1,764	.....	.....	1	421	.....	.....
TOTAL	22	1,104½	21	515	1,136	.....	.....	1	421	.....	.....

* Does not include wells drilled in connection with underground gas storage or service wells.

Table 7. *Oil wells and crude oil in Pennsylvania by counties, 1966, 1967**

<i>County</i>	<i>Number of producing oil wells as of 12/31/66</i>	<i>Crude oil production (bbls)</i>	<i>Number of producing oil wells as of 12/31/67</i>	<i>Crude oil production (bbls)</i>
Allegheny.....	288	99,310	288	96,576
Armstrong	124	11,229	108	10,516
Beaver	72	7,749	69	7,770
Butler.....	1,898	128,134	1,771	119,289
Clarion.....	442	27,519	429	29,143
Crawford	605	251,280	605	63,611
Elk.....	82	30,961	84	32,448
Fayette.....	4	429	4	352
Forest.....	644	82,035	654	65,448
Greene.....	278	48,606	280	49,767
Jefferson.....	87	3,164	87	3,011
McKean.....	20,008	2,617,447	19,118	2,534,254
Mercer.....	116	1,110	116	1,007
Potter.....	303	31,144	224	18,038
Venango.....	13,511	386,030	13,404	358,617
Warren.....	6,235	960,844	6,094	907,577
Washington.....	729	148,180	731	145,512
Total.....	45,426	4,835,171	44,066	4,442,945

*Data from the Bureau of Statistics, Department of Internal Affairs, Harrisburg, Pennsylvania.

in 1967 was 5,101 BOPD as compared with 4,795 BOPD in 1966. Table 7 shows the number of producing oil wells and the amount of crude oil produced in each county in Pennsylvania during 1966 and 1967. Crude oil prices during the year are shown in Table 8. The value of the crude oil and natural gas produced during 1967 is \$19,701,000 and \$23,228,000 respectively.

Figure 4 shows the annual production of crude oil in Pennsylvania from 1859 to 1967. The crude oil production of the Bradford District is shown in Figure 5. The monthly variation in crude oil price, production, and well completions is plotted in Figure 6 for the years 1930 to 1967 for the Bradford field.

Table 8. *Crude oil prices per barrel, Pennsylvania, 1967*

<i>Date</i>	<i>Bradford District</i>	<i>Middle District</i>	<i>Southwestern District</i>
Jan. 1 - Dec. 31, 1967	\$4.63	\$4.35	\$4.08

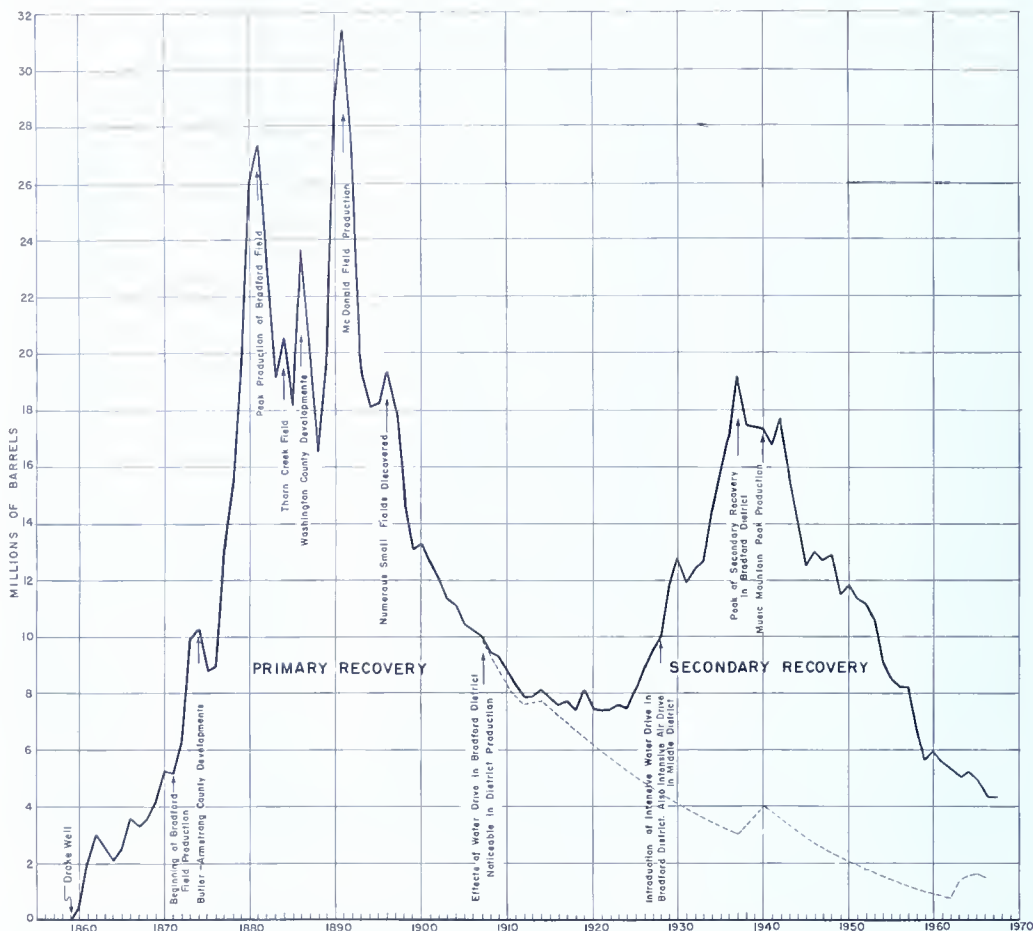


Figure 4. Annual production of crude oil in Pennsylvania.

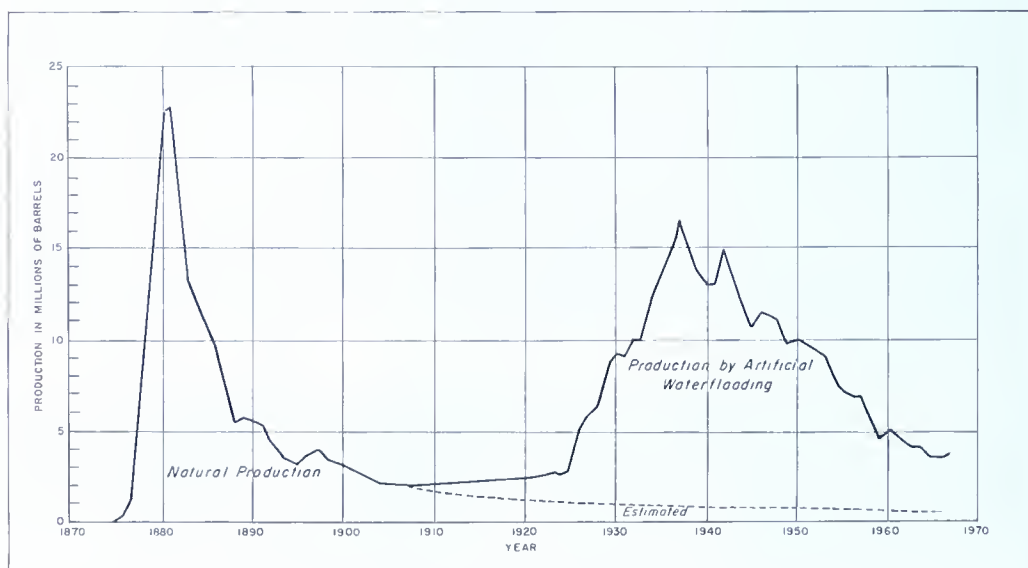


Figure 5. Crude oil production curve of the Bradford District, Pennsylvania and New York (Music Mountain field excluded).

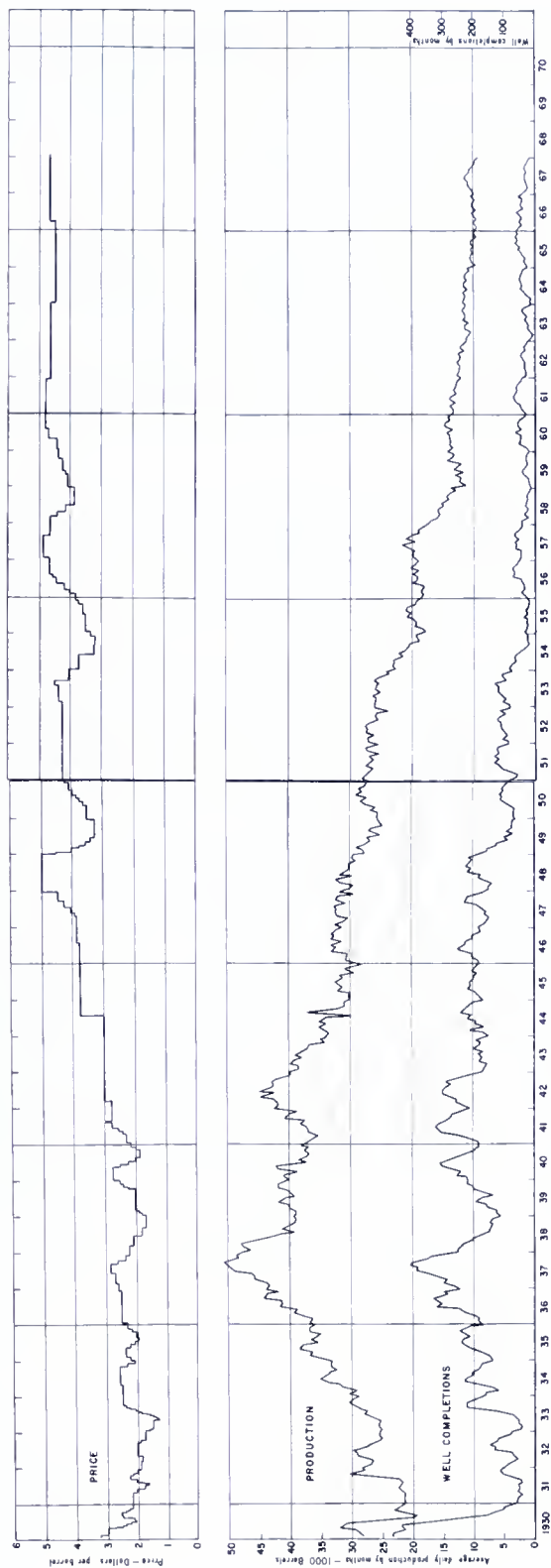


Figure 6. Crude oil prices, production, and well completions, Bradford field.

Most of the shallow drilling was in Indiana, Jefferson, McKean, Venango, and Warren Counties. Of the 157 gas wells drilled in Indiana and Jefferson Counties, 47 were drilled in the Marchand field and 30 in the Big Run field where production is from the Speechley, Balltown, Tiona, Bradford, and Kane reservoirs. Most of the 64 oil wells in McKean County were drilled in water-flooding projects in the Bradford field where production is from the Bradford Third sand. In Venango County 34 oil wells were completed with 11 wells producing from the Red Valley sand in the Pleasantville-Pithole field. In Warren County 62 Glade sand oil wells were drilled in the Youngsville-Sugar Grove field and 13 Venango Group oil wells were drilled in the Sanford field. The shallow gas produced in 1967 totaled 60,506,000 Mcf at a value of \$15,126,500.

DEEP-SAND EXPLORATION AND DEVELOPMENT

The 1967 deep-sand exploration in the Commonwealth discovered one new pool (Tables 3 and 11) in Cambria County. The 67 deep wells comprised 355,550 feet of hole. The deep gas produced during the year amounted to 29,460,000 Mcf at a value of \$8,101,500. The drilling depth record of 18,834 feet into the Upper Cambrian is still held by Tract 129 No. 1 well drilled by Consolidated Gas Supply Corp. and others in Stewardson Township, Potter County. The producing depth record of 11,510 feet is held by the Leo F. Heyn No. 1 well by William E. Snee and others in Fayette County which found commercial quantities of gas in the Tuscarora (Medina, Lower Silurian).

Of the 67 deep wells drilled during 1967, 36 tested the Medina, 66 tested the Oriskany and 1 reached the Hamilton. Twenty-one gas wells in the Indian Springs gas pool, 4 gas wells in the Lundys Lane, 9 gas wells and 1 dry hole in the Bushnell-Lexington, and 14 gas wells and 5 dry holes in the Elk Run pool were completed. The deep-well completions for Pennsylvania in 1967 are summarized in Table 9.

Table 9. *Summary of deep-well completions in Pennsylvania, 1967*

	<i>Development</i>	<i>Wildcat</i>	<i>Total</i>
Gas	45	5	50
Dry	8	9	17
Footage	266,582	88,968	355,550

A development well (No. 1 E. C. Ricks) in the Heyn pool in Fayette County had a show of gas in the pool reservoir, the Tuscarora Sandstone. Some trouble developed and operations have been suspended.

Additional information on two wells drilled in Mercer County in 1966 has been received and is discussed below. The No. 1 J. V. Johnson wild-cat in Sandy Lake Township was fractured in the open hole from 5,606 to 5,659 feet in the Lockport Dolomite. The open flow from this interval was 22,506 cubic feet at a rock pressure, after being shut-in for 40 hours, of 620 pounds per square inch. The well has been plugged and abandoned. The second well in the county was the Glenn W. Snyder, a deeper pool test in the Henderson field. The well was perforated between 5,341 feet and 5,370 feet in the Lockport Dolomite and fractured. The initial production after fracturing was 29,052 cubic feet at a rock pressure of 1,490 pounds per square inch after being shut-in for 140 hours. This well is the first well to produce gas from the Lockport in the Commonwealth.

The annual rate of deep-sand exploration and development is shown in Figure 7. The stratigraphy of the Minard Run Oil Company No. 1 well drilled in Bradford Township, McKean County is shown in Figure 8. The locations of all the deep wells drilled in Pennsylvania during 1967 are indicated in Figure 9.

At the end of 1967 a total of 2,899 deep wells had been drilled in the Commonwealth. Of the 2,899 deep wells, 1,738 were gas wells, 6 were oil and gas wells, 1,057 were dry holes, 95 were drilled for gas storage, and 3 are being used for waste disposal.

ELK RUN FIELD, JEFFERSON COUNTY, PENNSYLVANIA

The Elk Run gas field is a stratigraphic trap typical of the northeast-southwest trending series of "Oriskany" gas fields on the east limb of the Sabinsville anticline in west-central Pennsylvania. A map of the field is shown in Figure 10.

Closure is largely due to an updip porosity loss which is about a mile downdip from the regional pinchout of the Ridgeley Sandstone. Minor portions of the closure are due to a northeast-southwest trending, down-thrown-to-the-south fault at the north end of the field, and a southwest plunging nose at the south end. Downdip closure is against the gas-water contact at 5,940 feet below sea level.

Porosity is largely intergranular, with a maximum of about 20 percent and a mean of 7.75 percent; increasing in quality and thickness downdip. The gas is considered to be localized by the distribution of the over 6 percent porosity in the sandstone.

The original shut-in pressure was 3,960 psi (pounds per square inch), an overpressure of about 440 pounds for an average depth to the Ridgeley Sandstone of 7,246 feet. The original producible gas in place is estimated at 46,670,000 Mcf, with a recovery factor of 276.2 Mcf per acre foot.

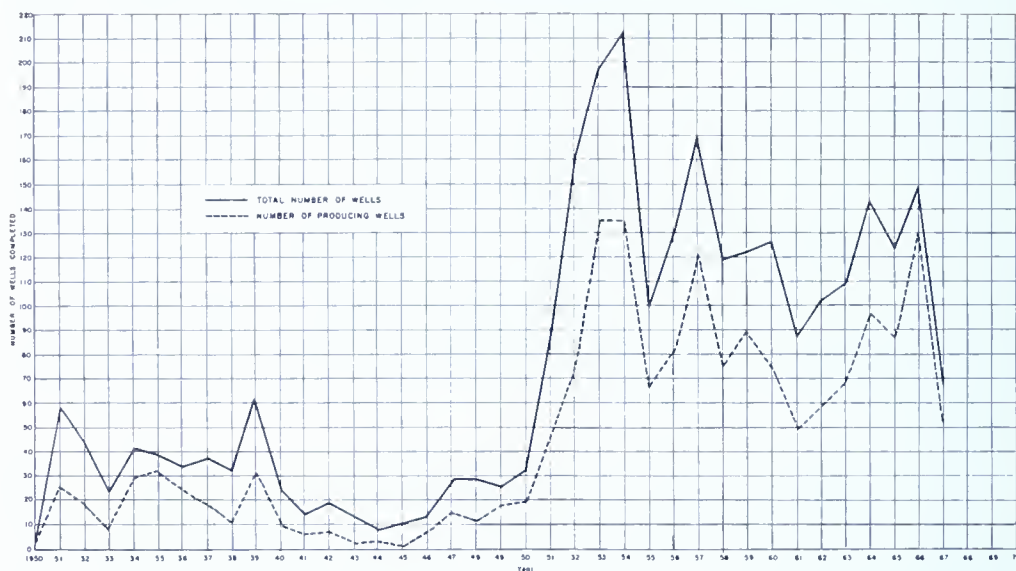


Figure 7. Annual rate of deep-sand exploration and development.

DEVONIAN RESOURCE STUDIES

The Pennsylvania Geological Survey has initiated semi-regional geologic investigations of the Middle and Upper Devonian of western Pennsylvania. The purpose of these studies is to establish a reference framework for understanding the distribution and composition of specific stratigraphic units associated with, or containing, natural resources such as gas, oil, water, clay, limestone, building materials, etc.

Issued during 1967, a progress report appraisal of one of the oil-producing Upper Devonian sandstones utilizing available detailed subsurface data illustrates the problems and potential usefulness of the recently initiated semi-regional investigations of the Devonian of western Pennsylvania. The report, "Geology of the Red Valley Sandstone in Forest and Venango Counties, Pennsylvania", Mineral Resources Report M57, defines economic geological facies.

Basin-type gray siltstones and shales grade within a short distance into narrow nearshore belts of clean, porous sandstone which correspond to areas of greatest economic potential. Shelfward from these belts the sandstones gradually become more laminated and cemented, forming widespread trends of generally marginal economic significance. Farthest shelfward the zone breaks up into interbedded sandstones, siltstones, and shales of negligible profitability.

MINARD RUN OIL COMPANY No. 1

Bradford Twp., McKean Co., Pa.

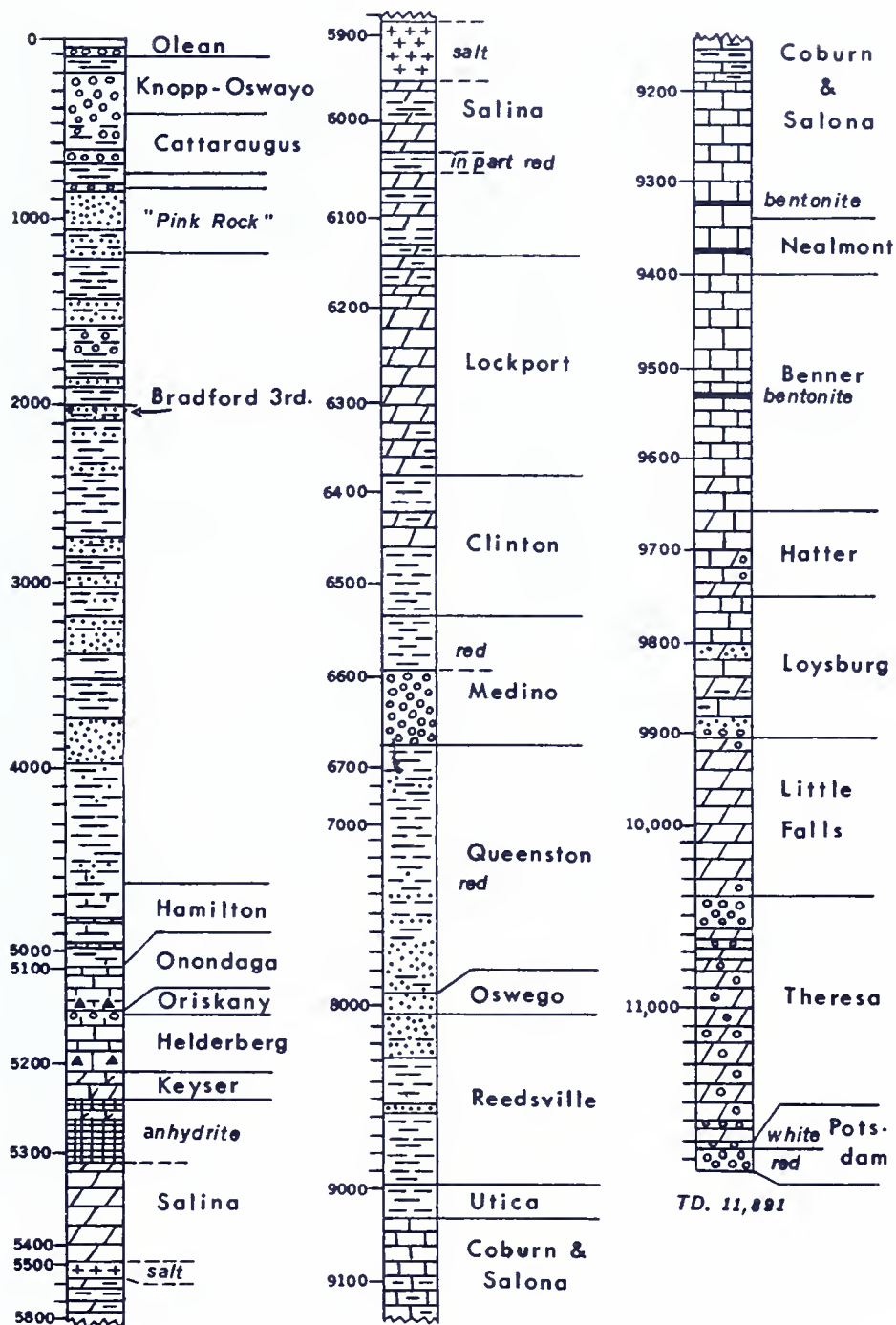


Figure 8. Stratigraphy of the Minard Run Oil Co. No. 1 well.

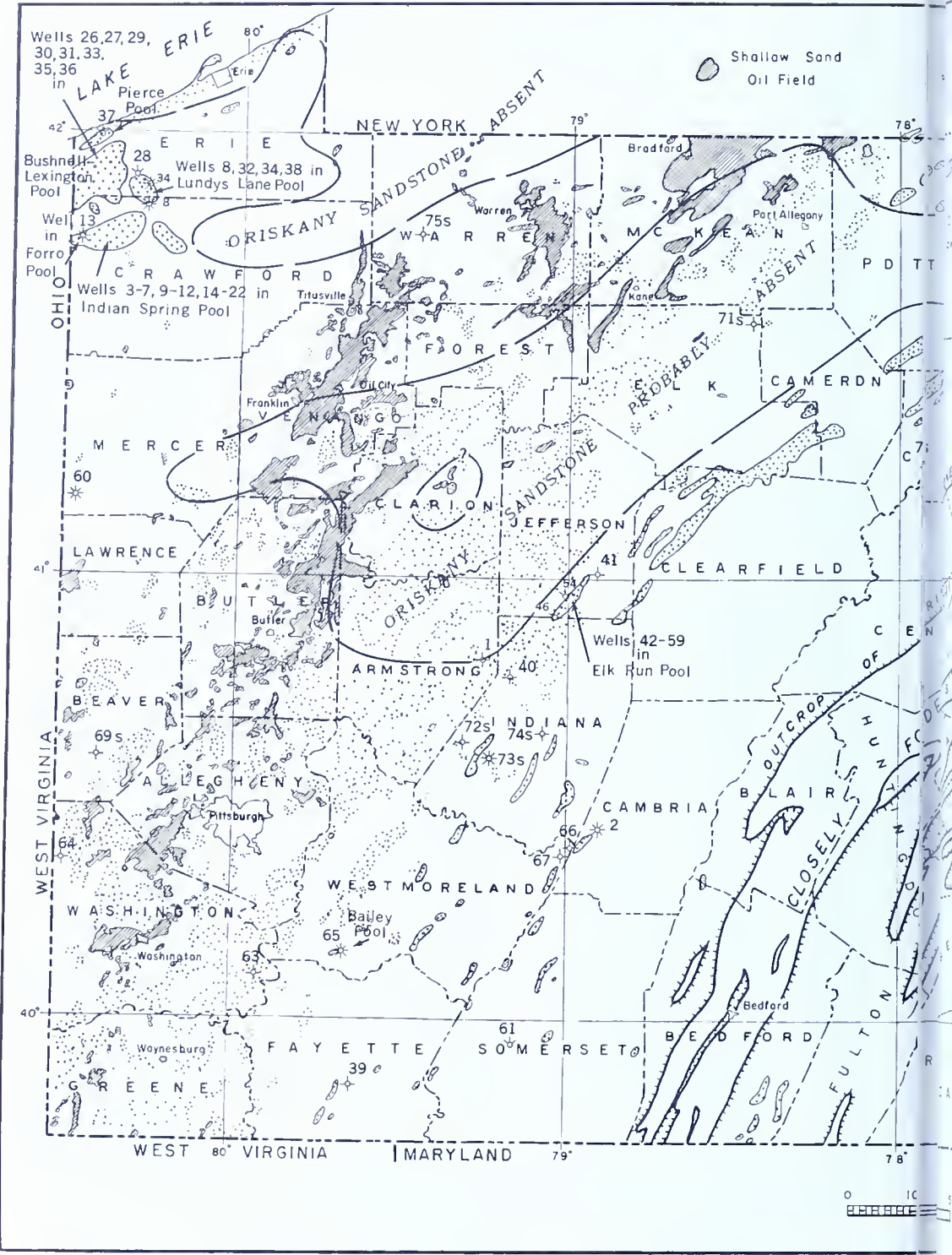
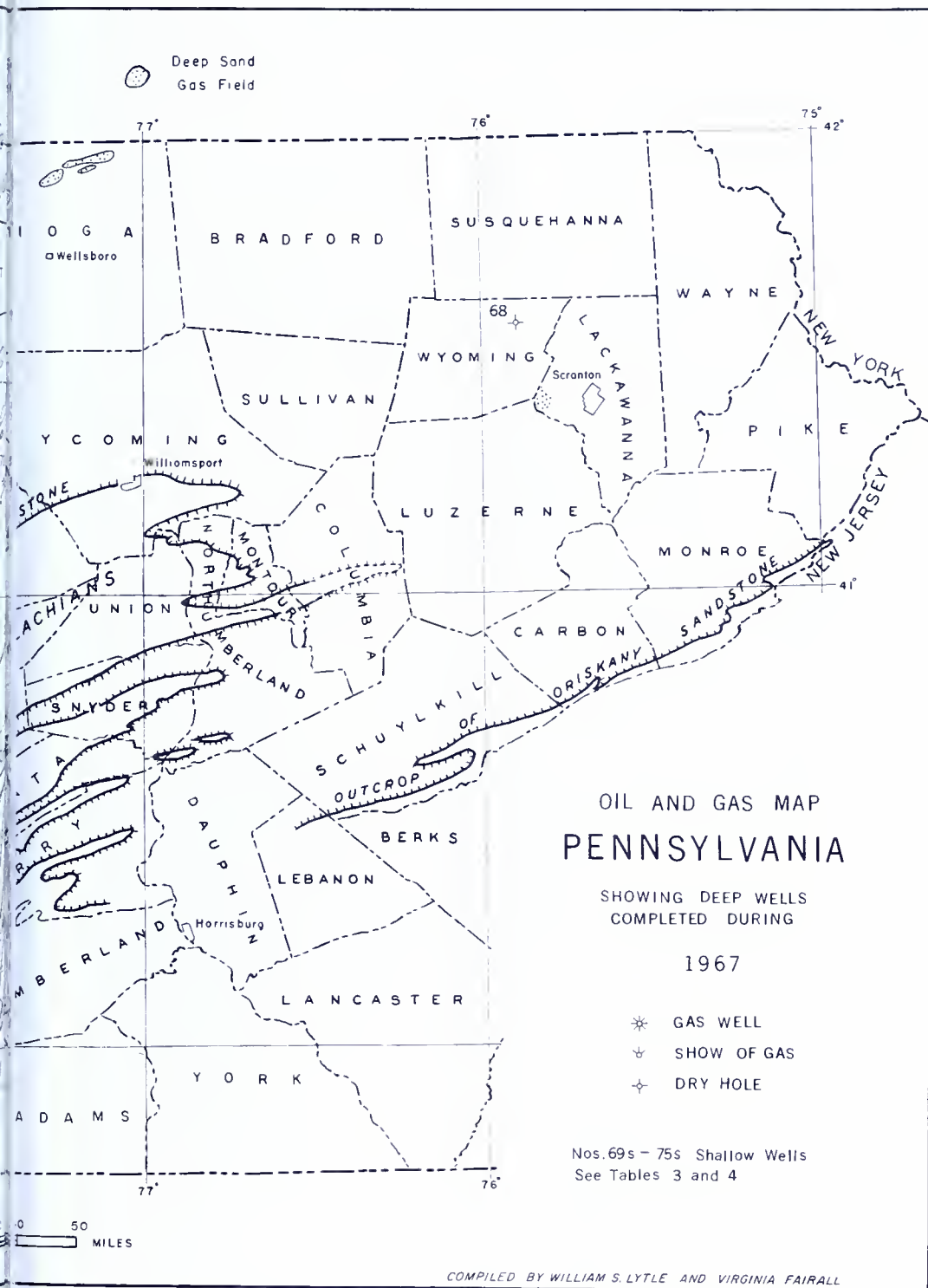


Figure 9.00 1967



The amount and type of pore-plugging fines, and secondary silica, carbonate, and clay cement varies both vertically within the Red Valley pay zone, and laterally in relation to the different facies. Accompanying a decrease in grain size, sorting and porosity, secondary interstitial quartz, kaolinite, and ankerite cement increase from the porous belt toward the nonporous shelf to the east. Detailed consideration of these variations could significantly improve completion and subsequent secondary recovery results.

During the latter part of 1967, the Pennsylvania Geological Survey published Mineral Resources Report 54, titled the "Oil and Gas Geology of the Amity and Claysville Quadrangles, Pennsylvania." The studied area covers over two-thirds of Washington County, Pennsylvania.

This report attempts to synthesize all of the published data in the area with the data assembled during the preparation of this particular study. Although modern geologic information is sparse, an attempt has been made to fit the old, mostly generalized geological information into a more specific, modern geologic framework.

All known wells were located on 7½-minute base maps, and every available drillers' log, set of well cuttings, geophysical log, core description, core analysis and well production history were collected and studied. This information was evaluated and is presented in the three figures, nine plates, two tables and six appendices of the report.

The studied area contains at least 22 productive or potentially productive oil and (or) gas reservoirs. These reservoirs are discussed in the text and the productive areas of the more prolific horizons are outlined on Plates 1 and 2.

In addition to the obvious uses to the Oil and Gas Industry, Bulletin M 54 should be valuable for the selection of subsurface reservoirs for waste effluent discharge, gas storage and possibly (in the future) potable water storage. The distribution of wells, mechanical descriptions of wells and subsurface geology will provide information to the geologists and engineers who would attempt to control subsurface water contamination by oil, gas, brine or sulfur and iron from coal. Those who would explore for brine reserves should be aided by the geologic data displayed in the report. Further, this report should provide the environmental geologists and urban planners with basic material with which they can determine the impact of the subsurface mineral resources and potential dangers and problems to the total economy and public safety of the studied area.

An analytical study of a Ridgeley ("Oriskany") stratigraphic gas accumulation was completed during 1967. The report, which is in press as Mineral Resources Report 59, concerns the Elk Run gas pool, Jefferson

County, Pennsylvania. The report was written using geophysical logs and completion-production data. The study emphasizes many aspects of the nature and extent of the reservoir and the possibility of similar studies of other gas pools.

A regional study of the Upper Devonian of western Pennsylvania has been underway during the past 18 months. In excess of 350 geophysical well logs in northwestern and west-central Pennsylvania have been collected. Locations for most of these wells have been obtained, well samples have been collected from over 25 wells, a small number of cores in the Upper Devonian section have been made available, and completion-production data has been gathered from some wells. Every attempt was made to acquire a balanced geographic distribution of data over the studied area.

Project base maps have been constructed on four 15-minute quadrangle sheets for over half of the project area of western Pennsylvania which consists of approximately sixty-four 15-minute quadrangles. All wells placed on these base maps will be designated by the well-numbering system presently employed by the Survey in its well-filing system.

To date, over 15 subsurface, stratigraphic cross sections have been constructed in western Pennsylvania between the New York state line and Butler County, Pennsylvania. In addition, "clean sand" isopach maps have been prepared for five Venango sandstone reservoirs in a six 15-minute quadrangle area, the Glade sandstone thickness has been mapped in an eight 15-minute quadrangle area and several structure maps have been prepared in a four 15-minute quadrangle area.

Petrographic examinations of all productive Upper Devonian sandstone reservoirs will be carried on concurrently with the correlation and mapping procedures as reservoir distributions are firmly established. Over 200 oriented and unoriented thin sections of Venango and Glade sandstone reservoirs have been prepared from cores and hand-picked, well-sample fragments. Many of these have been examined; in addition, X-ray patterns have been run on several selected reservoirs in order to determine clay cement components.

The first subregional study to be published will cover portions of Warren, Forest and Venango Counties.

A regional study on the Oriskany Group in the subsurface of Pennsylvania is in progress. This study is now in the planning and data collection stage. The project is aimed at providing information relative to questions such as: the relationship of the subsurface Oriskany Group to the superjacent Onondaga Group and the subjacent Helderberg Group; the occur-

rence of units and subsurface facies changes within the Oriskany Group, and the distribution of reservoir types within the Ridgeley Sandstone.

An additional project is concerned with the gas geology of the Elders Ridge and part of the Indiana 15-minute quadrangles, Armstrong and Indiana Counties. The project will interpret the stratigraphy and structure of the Upper Devonian gas sands and establish the relationship of environments of deposition to the occurrence of natural gas. Investigation has been concentrated in Plum Creek Township, Armstrong County and Washington and Armstrong Townships, Indiana County. The stratigraphic interval that has been examined extends from the Speechley Stray to the Balltown sand and includes the Speechley sand. Eight correlation sections using 93 wells have been prepared in sections "B" and "C" of Elders Ridge quadrangle, three sections with 17 wells show correlations from the Elders Ridge to the Indiana quadrangle, and one regional section of 17 wells shows the correlation of the Elders Ridge "Speechley" with the type Speechley of the Oil City quadrangle, Venango County. Base maps (scale 1:24,000) showing locations of 549 wells have been made and on these bases are drawn Speechley net sand isopachs, Speechley interval maps, and a structure map on the base of the Speechley.

The Elders Ridge project is still in the working stage. Correlation sections will be geographically extended. Isopach, interval and structure maps must be prepared for the Speechley Stray and Balltown sands. The distribution of gas fields will be related to the distribution of the individual sands. The present maps must be updated with information from new wells drilled.

A report on the oil and gas geology of the Kinzua quadrangle, Warren and McKean Counties, Pennsylvania is to be published in the near future. All known wells drilled for oil and gas have been located and plotted on farm line maps. Drillers' logs and mechanical logs have been obtained from the operators and used in the construction of cross sections, isopach maps and structure maps. The cross sections will be tied into the correlations of the regional Upper Devonian project. Most of the illustrations for the report have been prepared and part of the text has been written. With the completion of the text, the report will be published as a mineral resources bulletin.

The objective of this report is to present data on the shallow Devonian sandstones that may have immediate practical application for the oil operators of Pennsylvania. It is hoped that the presentation of this material will stimulate exploratory and development drilling, increased industry cooperation, and improved methods of obtaining data.

CURRENT ACTIVITY

The Venango First sand steam flood in the Franklin-Oak Forest field in Venango County during the last three years has recently been converted to a water flood. A steam flood operating for several years in the Bradford field in New York State has just recently been expanded — an indication of some success with this type of flood. Also in Pennsylvania's Bradford field a pilot Maraflood project has been started to determine the economics of such a flood in Pennsylvania's giant field which is in the last stages of a long history of water flooding.

Project Ketch, whose proposed site is in Sproul State Forest, Beech Creek Township, Clinton County, is an experiment designed to determine whether it is economically and technically feasible to create underground gas storage capacity by detonating a 24-kiloton nuclear device.

On August 11, 1967, the Commonwealth of Pennsylvania gave approval to proceed with Phase I of Project Ketch. Phase I, lasting about 8 months, will consist of exhaustive tests to determine the safety and technical feasibility of the project. This work will be done in advance of any detonation of a nuclear device to create underground natural gas storage. As yet the parties involved have not agreed on the terms of the lease, therefore, Phase I cannot be started until these terms are agreed upon and the lease is signed. Possibly this will take place in the spring of 1968.

If the Phase I studies show that the detonation of a nuclear device is not in the best interests of the Commonwealth, the Commonwealth reserves the right to refuse permission to proceed with Phase II — Execution.

Sealed bids on Pennsylvania's 37 offshore Oil and Gas Lease Blocks, 25 tracts per block, in the Pennsylvania portion of Lake Erie are to be opened in the early spring of 1968. A bid will not be accepted if it is less than \$1.00 per acre. The spacing density unless changed shall be one gas well per tract (approximately 630 acres) and one oil well per approximately 40 acres, or 16 wells per tract. The total acreage of the 37 blocks comprises 369,988.58 acres.

ARTICLES ON PENNSYLVANIA GEOLOGY, 1967

- Anonymous (1967), *Ohio gas consumption exceeds production*, Oil and Gas Jour., v. 65, no. 16 (April 17), p. 228, 230, 232.
- (1967), *New drilling target aimed for in West Virginia*, Oil and Gas Jour., v. 65, no. 20 (May 15), p. 118-120.
- (1967), *Economics favor nuclear gas-storage caverns*, Oil and Gas Jour., v. 65, no. 36 (September 4), p. 72.
- Beutner, E. C., Flueckinger, L. A., and Gard, T. M. (1967), *Bedding geometry in a Pennsylvania channel sandstone*, Geol. Soc. America Bull., v. 78, no. 7, p. 911-915.
- Bossler, Robert B. (1967), *Use of shrinkage of unproduced crude oil to determine the oil remaining in the reservoir at the end of water flooding*, Producers Monthly, v. 31, no. 3, p. 18-20.
- Brammer, Gerald N. (1967), *A look at Ohio's results from fracturing*, Oil and Gas Jour., v. 65, no. 17 (April 24), p. 78-80, 82.
- Donohue, David A. T. (1967), *Can aerial photography improve oil recovery?* Oil and Gas Jour., v. 65, no. 28 (July 10), p. 201-203.
- Frohne, Karl-Heinz (1967), *Appalachian region oil field reservoir investigation, Keener, Big Injun, and Squaw Sands, Greenwood Oil Field, Central District, Doddridge County, West Virginia*, Producers Monthly, v. 31, no. 9, p. 14-16.
- Hartenstein, W. G. (1967), *Hydrocarbon whys and wherefores*, Oil and Gas Jour., v. 65, no. 52 (December 25), p. 200-206, 208, 213.
- Ireland, H. A. (1967), *A pre-Drake oil well*, Geotimes, v. 12, no. 7, p. 17-18.
- Kelley, Dana R. (1967), *Geology of the Red Valley sandstone in Forest and Venango Counties*, Pennsylvania Geological Survey, 4th series, Bull. M 57, p. 49, 11 figs., 5 pls., 8 tables.
- (1967), *Relationship of geology and production in the Red Valley and Venango sandstones middle producing district, Pennsylvania*, Producers Monthly, v. 31, no. 3, p. 10-17.
- Locke, David C. (1967), *Appalachian region oil field reservoir investigations, Clinton Sand, S. S. Fry South Oil Field, Rose Township, Carroll County, Ohio*, Producers Monthly, v. 31, no. 10, p. 11-13.

- Lytle, William S. (1967), *Developments in Pennsylvania, 1966*, Am. Assoc. Petroleum Geologists Bull., v. 51, no. 6, p. 1011-1017.
- (1967), *Pennsylvania oil and gas development 1966*, International Oil Scouts Assoc. Yearbook 1967 (Review of 1966), v. 37, pt. 1, p. 298-304, pt. 2, p. 350-351.
- (1967), *How steam rates in Pennsylvania*, Oil and Gas Jour., v. 65, no. 4 (January 23), p. 101, 104, 106.
- , Heyman, Louis, and Wagner, Walter R. (1967), *Oil and gas developments in Pennsylvania in 1966*, Pennsylvania Geological Survey, 4th series, Progress Report 173, 51 p., 11 figs., 11 tables.
- McGlade, William G. (1967), *Oil and gas geology of the Amity and Claysville quadrangles*, Pennsylvania Geological Survey, 4th series, Bull M 54, 131 p., 3 figs., 9 pls., 2 tables.
- Meckel, L. D. (1967), *Origin of Pottsville conglomerates (Pennsylvanian) in the central Appalachians*, Geol. Soc. America Bull., v. 78, no. 2, p. 223-258.
- Nickelsen, R. P. and Hough, V. N. D. (1967), *Jointing in the Appalachian Plateau of Pennsylvania*, Geol. Soc. America Bull., v. 78, no. 5, p. 609-630.
- Overbey, William K., Jr. (1967), *Lithologies, environments and reservoirs of the Middle Mississippian Greenbrier Group in West Virginia*, Producers Monthly, v. 31, no. 2, p. 25-32.
- Quillian, R. G. (1967), *Good Siluro-Devonian gas prospects in Lake Erie*, World Oil, v. 65, no. 4 (September), p. 61-64.
- Robertson, James F. (1967), *Drive for Lake Erie gas mushrooming*, Oil and Gas Jour., v. 65, no. 23, (June 5), p. 59-60.
- Smith, Richard E. (1967), *Petrographic properties influencing the reservoir potential of the Gatesburg Formation based on studies near State College and Tyrone, Pennsylvania*, Producers Monthly, v. 31, no. 6, p. 18-23.

Table 10. — *Deep-gas production in Pennsylvania, 1967*
(*Production in Mcf*)

† Production since discovery 6/20/65 to 12/31/67

• "Shallow" Gas Production of Field Not Shown

•• Corrected Figures

County	Field	Pool	Discovery Date	Cumulative Production at End of 1966	Production 1967	Cumulative Production at End of 1967	Status of Field or Pool at End of 1967
Armstrong	Shellhammer*	Rupert	11/14/58	349,291	6,305	355,596	Producing
Bedford	Artemus	TOTAL	7/30/63	2,322,000	32,000	2,364,000	Producing
		Artemus	7/30/63	1,547,000	18,000	1,565,000	Producing
		Pennland	8/28/64	785,000	14,000	799,000	Producing
	Big Mt.		10/ 6/64	712,000	4,000	716,000	Producing
	Five Forks		6/21/62	13,812,000	429,000	14,241,000	Producing
	Purcell		12/14/57	2,914,000	67,000	2,981,000	Producing
Cambria	Rager Mt.		10/16/65	434,726	1,713,160	2,147,886	Producing
Cameron & Elk	Whippoorwill		7/10/61	12,307,000	608,000	12,915,000	Producing
Cameron, Elk, Jefferson, Clear- field & Indiana	Punxsutawney- Driftwood	TOTAL	9/15/51	454,785,000	5,360,000	460,145,000	Producing
		Benezette	1/ 5/53	235,800,000	1,577,000	238,377,000	Producing
		Driftwood	9/15/51				Producing
		Boone Mt.	9/18/58	96,570,000	1,977,000	98,547,000	Producing
		DuBois	1/ 6/60				Producing
		Sabula	8/26/63	615,000	64,000	679,000	Producing
		Helvetia	5/11/60				Producing
		Reed-	5/ 9/55				Producing
		Deemer	12/ 1/53	117,200,000	1,635,000	118,835,000	Producing
		Rockton	2/25/55				Producing
		Sykesville	11/10/60				Producing
		Hicks Run	6/ 7/56	3,600,000	107,000	3,707,000	Producing

Table 10. — *Deep gas production in Pennsylvania, 1967, Continued*

County	Field	Pool	Discovery Date	Cumulative Production at End of 1966	Production 1967	Cumulative Production at End of 1967	Status of Field or Pool at End of 1967
Clinton & Potter	Leidy	TOTAL	1/ 9/50	159,576,399	193,349	159,769,748	Gas Storage & Producing
		Ole Bull	1/ 9/59	4,776,367	193,349	4,969,716	Producing
Crawford & Erie	Conneaut	TOTAL	2/11/57	14,329,706	4,528,406	18,858,112	Producing & Abandoned
		Bushnell-					
		Lexington	12/31/58	7,198,088	2,050,681	9,248,769	Producing
		Indian Spring	9/11/57	5,093,858	1,280,000	6,373,858	Producing
		Kastle	7/14/62	1,039,000	324,000	1,363,000	Producing
Erie	Burgess Corry	Lundy Lane	11/ 9/61	532,273	385,428	917,701	Producing
		Pierce	12/31/58	276,487	488,297	764,784	Producing
		TOTAL	10/17/60 4/29/47	114,010 1,006,530	7,760 7,784	121,770 1,014,314	Producing Gas Storage & Producing
		Beaver Dam	5/20/53 8/23/46	152,830 4,898,019	7,784 6,422	160,614 4,904,441	Producing Oriskany Gas Storage (One Producing Medina Well)
Fayette	Phillipsville		7/17/56	5,000			Shut In Abandoned 11/1/67
		Dennee	10/ 8/65				
			8/ 8/63	163,239	24,779	188,018	Producing
			12/28/59	3,045,574	205,194	3,250,768	Producing
			10/13/61		297,454	297,454	Producing & Abandoned
Summit	Summit	TOTAL	3/24/38	41,151,615	309,901	41,461,516	Producing
		North Summit	3/24/38	20,564,266	74,492	20,638,758	Producing
		South Summit	5/ 9/42	20,519,540	235,409	20,954,949	Producing

Indiana	Cherry Hill*	Crichton Hadden	1/ 9/63 7/11/63 9/21/56 9/30/56	2,004,413 24,550,156 6,580,000	241,419 431,621 147,000	2,245,832 24,981,777 6,727,000	Producing Producing Producing
Jefferson	Big Run	Elk Run	6/20/65		22,800,000†	22,800,000	Producing
Potter	Ulysses	New Field	10/ 2/39 4/ 2/62	2,812,701	182,017	2,994,718	Producing
Somerset	Boswell	TOTAL	11/11/58	8,538,002	505,616	9,043,618	Producing
		Boswell	11/11/58	7,834,852	454,480	8,289,332	Producing
		Snyder	6/16/60	703,150	51,136	754,286	Producing
Washington	Daniels Run*	Glyde	9/ 6/61	52,317	8,221	60,538	Producing
Westmoreland	Blairsville*	Kahl	10/23/62	5,604,314*	833,862	6,438,176	Producing
	Latrobe*	Dry Ridge	8/25/46	3,603,094	486,576	4,089,670	Producing
	Jacobs Creek*	Bailey	12/26/61	481,537	81,625	563,162	Producing
	Lycippus	TOTAL	8/17/49	5,443,957	142,950	5,586,907	Producing & Abandoned
		St. Boniface					
		Chapel	9/13/56	4,704,529	142,950	4,847,479	Producing
	Murrysville*	TOTAL	11/ 3/1878	222,358	56,007	278,365	Producing
		Sloan	10/22/63	94,665	15,149	109,814	Producing
		Duquesne	8/ 8/65	127,693	40,858	168,551	Producing
Westmoreland & Somerset	Johnstown	TOTAL	5/16/57	17,848,386	1,330,919	19,179,305	Producing
		Baldwin	5/22/60	6,126,364	470,353	6,596,717	Producing
		Beck	5/16/57				
		Williams	2/14/58	11,722,022	860,566	12,582,588	Producing
	Seven Springs	TOTAL	12/15/58	5,558,829	433,633	5,992,462	Producing & Abandoned
		Blair	12/ 5/58	4,835,406	302,116	5,137,522	Producing
		Tunnel	3/10/65				Abandoned
		Clarke	3/15/61	397,217		397,217	Producing
		Seven Springs	8/ 3/66		131,517	131,517	Producing

TABLES 11 AND 12

The information presented in the tables has been compiled mainly from drillers' logs and location plats received from the Oil and Gas Division of the Department of Mines and Mineral Industries. Other sources of data are Petroleum Information Corporation (PI), geophysical logs received by the Survey, and personal communications with the oil and gas operators. In cases where no well information was available from the Department of Mines and Mineral Industries, the location and completion status of the well was usually obtained from PI. For formation tops and completion results the interested person is advised to contact either the operator of the well or PI.

Meanings of the abbreviations used in the table are listed below:

AF—after fracture

DF—derrick floor elevation

G—ground level elevation

GR—gamma ray log

KB—Kelly Bushing elevation

Mcf—thousand cubic feet

Nat—natural production

PB—plugged back

PI—Petroleum Information Corporation

perf—perforated

P & A—plugged and abandoned

psi—pounds per square inch

RT—Rotary table elevation

SG—show of gas

SO—show of oil

SSO—small show of oil

SW—salt water

Table 11. — Summarized records of deep wells drilled in Pa., 1961

MAP NUMBER	1	2	3	4	5	6	7	8	9	10
COUNTY	ARMSTRONG	CAMBRIA	CRAWFORD	CRAWFORD	CRAWFORD	CRAWFORD	CRAWFORD	CRAWFORD	CRAWFORD	CRAWFORD
NAME OF WELL	Wesley J. Hilly 1	Geo. V. Griffith 1	John Augustine 1	C. Z. Clements 2	C. Z. Clements 1	J. R. Clements 1	Davis 1	James Francis 1	T. L. Graham 3	H. M. Hoover 1
OPERATOR	The Peoples Nat. Gas Co.	The Peoples Nat. Gas Co.	James Drilling Corp.	James Drilling Corp.	James Drilling Corp.	James Drilling Corp.	Burham Gas Co.	J. Sterling McCluney	James Drilling Corp.	James Drilling Corp.
TOWNSHIP	Cowarthannock	Jackson	Spring	Spring	Spring	Spring	Spring	Spring	Spring	Spring
QUADRANGLE	Rural Valley I 3	Johnstown B 6	Girard H 367	Girard I 354	Girard I 376	Girard I 353	Girard H 356	Girard F 364	Girard H 357	Girard H 351
LATITUDE	10,240 ft. S 40°50'	22,150 ft. S 40°30'	28,150 ft. S 41°50'	24,800 ft. S 41°50'	25,700 ft. S 41°50' (PI)	26,400 ft. S 41°50'	23,800 ft. S 41°50'	27,300 ft. S 41°50'	26,800 ft. S 41°50'	26,900 ft. S 41°50'
LONGITUDE	4700 ft. W 79°21'	21,200 ft. W 78°50'	5900 ft. W 80°20'	21,900 ft. W 80°15'	19,500 ft. W 80°15' (PI)	22,500 ft. W 80°15'	3950 ft. W 80°20'	16,400 ft. W 80°15'	6700 ft. W 80°20'	2900 ft. W 80°20'
DATE COMPLETED	4-29-67	10-9-67	9-9-67	6-14-67	11-7-67	6-7-67	2-6-67	8-7-67	6-28-67	1-14-67
ELEVATION	1160 G	2451	1088 G	1262 KB	1280 KB	1250 KB	1187 DF	1136 KB	1050 G	1150 KB
TULLY	6518-	7146-	2260-	2426-	2422-2460	2895-	2895-	2120-	2318-2350	GR 2760-
ONONOGA	7055-	7917-	2425-	2599-	GR 2594-	2470-	2312-	2367-	GR 2480-	GR 2680-
ORISKANY	8022-	8022-	8022-	8022-	2788-	2788-				
SALINA	Helderberg, 7187-	Helderberg, 8058-			GR 2865-					
GUELPH - LOCKPORT Black Water			3450	3638	GR 3521-	GR 3521-	3552	3435	GR 3443-	GR 3650
CLINTON			3686-	3810-	GR 3760-	GR 3760-	3470-	3524-	GR 3652-	GR 3723-
MEONA			perf: 3773-3811	perf: 3819, 3925, 3950	GR 3870-	GR 3870-	perf: 3842-3844, 3860	perf: 3609-3643 15 Mcf gas	perf: 3715-3737	3761- perf: 3812-3814 3830, 3845
QUEENSTON			3909-	4038 -	GR 4049-	GR 4049-	3960-	3737-	3832-	GR 3941 -
MIDDLE OROOVICIAN LIMESTONES										
GATESBURG										
TOTAL DEPTH	7230	8109	3955	4047	4095 (PI)	4080	3999	3765	3862	GR 3999
DEEPEST FORMATION REACHED	Helderberg	Helderberg	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULT	Dry in Oriskany	5000 Mcf gas AP 2950 psi 5 days	3500 Mcf gas AP 1125 psi 48 hours	1500 Mcf gas AP 1175 psi 48 hours	Gas well Logo not yet released to State	1000 Mcf gas AP 1190 psi 48 hours	1507, 500? Mcf gas AP 950 psi 60 hours Show oil reported	2000 Mcf gas AP 1095 psi 60 hours	1000 Mcf gas AP 1160 psi 60 hours	1100 Mcf gas AP 1120 psi 48 hours

Table 11. — Summarized records of deep wells, Continued

MAP NUMBER	11	12	13	14	15	16	17	18	19	20
COUNTY	CRAWFORD	CRAWFORD	CRAWFORD	CRAWFORD	CRAWFORD	CRAWFORD	CRAWFORD	CRAWFORD	CRAWFORD	CRAWFORD
Permit Number	216	210	212	224	214	222	217	214	222	217
NAME OF WELL	M. E. Jamison 1	S. L. Marks 1	Paul Neathur 1	J. W. McBride 1	J. W. McBride 2	Lloyd R. Nelson 1	Wm. V. Onderko 1	R. Schreiber 1	Chester Smith 1	F. M. Smith 1
OPERATOR	James Drilling Corp.	James Drilling Corp.	James Drilling Corp.	James Drilling Corp.	James Drilling Corp.	James Drilling Corp.	James Drilling Corp.	James Drilling Corp.	J. Sterling McCluskey	James Drilling Corp.
TOWNSHIP	Summerhill	Spring	Beaver	Spring	Summerhill	Spring	Spring	Spring	Beaver	Summerhill
QUADRANGLE	Girard I 380	Girard I 366	Girard G 355	Girard H 358	Girard H 368	Girard I 369	Girard I 360	Girard I 377	Girard O 374	Girard H 365
LATITUDE	29,250 ft. S 41°50' (PI)	28,600 ft. S 41°50'	24,900 ft. S 41°50'	28,450 ft. S 41°50'	30,200 ft. S 41°50'	19,600 ft. S 41°50' (PI)	22,500 ft. S 41°50'	24,150 ft. S 41°50' (PI)	21,150 ft. S 41°50'	29,000 ft. S 41°50'
LONGITUDE	20,200 ft. W 80°15' (PI)	22,400 ft. W 80°15'	17,500 ft. W 80°25'	3350 ft. W 80°20'	3250 ft. W 80°20'	19,350 ft. W 80°15' (PI)	20,400 ft. W 80°15'	20,450 ft. W 80°15' (PI)	3800 ft. W 80°25'	4800 ft. W 80°20'
DATE COMPLETED	12-30-67	7-10-67	3-11-67	6-22-67	8-17-67	8-5-67	7-16-67	11-14-67	10-24-67	7-22-67
ELEVATION	1284 RF	1225 KB	1113 KB	1044 KB	1100 KB	1252 KB	1240 KB	1248 KB	1087 KB	1030 KB
TULLY	2407-	2158-	2158-	2217-	2291-		2573-		2336-	2150-
ONONOAGA	2578-	2320-	2320-	2380-	2460-					2359-
ORISKANY	SH @ 2700	SH @ 2539	SH @ 2539	SH @ 2565	SH @ 2840		SH @ 2765		SH @ 2580	SH @ 2543
SALINA										
GUELPH - LOCKPORT Black Water	3580	3397	3460	3485			3624		3637	3440
CLINTON	IRONDEQUOIT	3820-	3550-	3631-	370-		3866-		3565-	3611-
MEONA	perft: 3918-3946	perft: 3650-3665	perft: 3715-3733	perft: 3814-3834			perft: 3898, 3922-3934		perft: 3656-3687	perft: 3679, 3693-3701
QUEENSTON	4039-	3774-	3853-	3921-			4022-		3790-	3840-
MIDDLE ORDOVICIAN LIMESTONES										
GATESBURG										
TOTAL DEPTH	4109 (PI)	4058	3784	3860	3921	4041 (PI)	4044	4015? 4060? (PI)	3805	3840
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston?	Queenston	Queenston
RESULT	Gas well Logs not yet released to State	1000 Mcf AF 840 psi 48 hours	664 Mcf gas AF 1170 psi 48 hours	2500 Mcf gas AF 1210 psi 48 hours	1200 Mcf gas & 50 AF 970 psi 48 hours	Gas well Logs not yet released to State	2600 Mcf AF 1190 psi 48 hours	Gas well Logs not yet released to State	4240 Mcf AF 1160 psi 72 hours	1500 Mcf AF 1120 psi 48 hours

MAP NUMBER	21	22	23	24	25	26	27	28	29	30
COUNTY	CRAWFORD 220	CRAWFORD 219	CRAWFORD	CRAWFORD	CRAWFORD	ERIE 236	ERIE 280	ERIE 287	ERIE 282	ERIE 302
NAME OF WELL	D. Snyder 1	E. & L. Tinker 1	Lloyd Ward 1	John Walsh 1	George Wise 1	Babb 2	D. & E. Bennett 1	George Carr 1	Fobes 2	Layman 1
OPERATOR	Burnham Gas Co.	Burnham Gas Co.	James Drilling Corp.	James Drilling Corp.	James Drilling Corp.	Britton et al	Vaught Oil Co.	Cayman Corp.	Horlbride Pet. Corp.	Betz Oil Inc.
TOWNSHIP	Spring	Spring	Spring	Spring	Summerhill	Conneaut	Conneaut	Cranesville Boro.	Conneaut	Springfield
QUADRANGLE	Girard H 359	Girard H 373	Girard I 379	Girard I 378	Girard H 375	Girard D 352	Girard B 350	Girard E 345	Girard E 346	Girard A 370
LATITUDE	25,250 ft. S 41°50'	20,400 ft. S 41°50'	16,600 ft. S 41°50' (PI)	18,600 ft. S 41°50' (PI)	29,900 ft. S 41°50'	15,800 ft. S 41°55'	29,700 ft. S 42°00'	3100 ft. S 41°55'	4,650 ft. S 41°55'	27,900 ft. S 42°00'
LONGITUDE	1700 ft. W 80°20'	3600 ft. W 80°50'	17,350 ft. W 80°15' (PI)	21,900 ft. W 80°15' (PI)	250 ft. W 80°20'	19,500 ft. W 80°25'	19,600 ft. W 80°20'	1550 ft. W 80°20'	17,900 ft. W 80°20'	6500 ft. W 80°25'
DATE COMPLETED	6-6-67	10-28-66	12-28-67	11-30-67	9-30-67	4-25-67	1-26-67	2-3-67	3-3-67	10-16-67
ELEVATION	1204 DF	1210 G	1235 DF	1255 G	1210 KB	947 G	858 G	1009 DF	917 DF	870 KB
TULLY	2335-	2315-			2403-		1638-1653 GR	1843- GR		
ONONDAGA	2510-	2493-			2575-	1950-	1805- GR	2030- GR		1760-
ORISKANY	SW @ 2726	SW @ 2710			SW @ 2755	SW @ 2246	SW @ 2066-72	SW @ 2307-15	SW @ 2157	SW @ 2158
SALINA							2178- GR	2388- GR		
GUELPH - LOCKPORT Black Water	3590	3559			3582		2718- GR 2835	2929- GR	2915	2690
CLINTON IRONOREDUIT	3774-	3731-			4033-	3170-	2940 GR 3007- GR	3163- GR 3230- GR	3098-	2960-
MEDINA	perf: 3871, 3880-3890	perf: 3832-3853			perf: 3914-3928 3942-3944	perf: 3260, 3265	3038- perf: 3082-3113	3265- GR 3267- perf: 3307, 3332-39	perf: 3194-3208	perf: 3023-25 3051-57
QUEENSTON					4041-		3210- GR			
MIDDLE PRODOVICIAN LIMESTONES										
GATESBURG										
TOTAL DEPTH	4003	3964	39801	4011 (PI)	4080	3375	3267	3407	3232	3175
DEEPEST FORMATION REACHED	Queenston?	Queenston	Medina	Queenston	Queenston	Queenston?	Queenston	Medina	Medina	Queenston
RESULT	2000 Mcf AF 1150 psi 60 hours	150 Mcf & 50 AF 950 psi 60 hours	Gas well Logs not yet released to State	Gas well Logs not yet released to State	1600 Mcf AF 1025 psi 48 hours	1650 Mcf AF 750 psi 24 hours	380 Mcf AF 810 psi	500 Mcf AF 678 psi 1 mo.	1510 Mcf AF 1035 psi	2750 Mcf AF 1025 psi 48 hours

Table 11. — Summarized records of deep wells, Continued

MAP NUMBER	31	32	33	34	35	36	37	38	39	40
COUNTY	ERIE 277	ERIE 298	ERIE 293	ERIE 299	ERIE 283	ERIE 297P	ERIE 295	ERIE 278	FAYETTE 56	INDIANA 984
NAME OF WELL	S. & H. Mackey 1	Frank Main 1	Pa. State Glaze Lands 2	G. Proudfoot 1	Reinke 1	S. Stewart Unit 2 (D.S. Olmstead)	Sjostrom Fee 1	Bruce Watson 1	E. C. Hicks 1	Earl L. Beatty 1
OPERATOR	Midterra Assoc., Inc.	Cayman Corp.	Platco Corp.	Platco Corp.	Horlövde Pet. Corp.	V. H. Simmons	Martin Sjostrom	Midterra Assoc. Inc.	Wm. E. Stree et al.	The Peoples Nat. Gas Co.
TOWNSHIP	Springfield	Elk Creek	Conneaut	Elk Creek	Conneaut	Conneaut	Springfield	Conneaut	Wharton	S. Mahoning
QUADRANGLE	Girard D 349	Girard F 372	Girard D 363	Girard F 371	Girard E 347	Girard A 363	Girard A 362	Girard F 348	Uniontown E 42	Snicksburg G 33
LATITUDE	1100 ft. S 41°55'	22,200 ft. S 41°55'	21,600 ft. S 41°55'	15,500 ft. S 41°55'	6000 ft. S 41°55'	25,000 ft. S 42°00'	2300 ft. S 42°00'	16,800 ft. S 42°55'	26,700 ft. S 39°55'	21,500 ft. S 40°50'
LONGITUDE	1500 ft. W 80°30'	20,400 ft. W 80°15'	12,400 ft. W 80°25'	15,400 ft. W 80°15'	16,200 ft. W 80°20'	16,800 ft. W 80°25'	1950 ft. W 80°25'	19,100 ft. W 80°15'	19,700 ft. W 79°35'	2650 ft. W 79°10'
DATE COMPLETED	1-20-67	11-8-67	3-30-67	9-22-67	3-3-67	9-1-67	4-26-67	1-10-67	12-29-67	11-2-67
ELEVATION	839 G	1122 KB	970 G	1160 KB	910 G	888 KB	665 DF	1140 G	2359 KB	1248 KB
TULLY		2100-				1484-	1220-			
ONONDAGA	1721-	2280-	2013-	2280-		1670-	1391 -	2276-		
ORISKANY		SW @ 2474	SW @ 2315	SW @ 2535		1904-17 SW, SH	1671-1683 SW, SH			
SALINA										
GUELPH-LOCKPORT Black Water				3276	2964					
CLINTON	2033-	3476-	3226-	3465-	3120-			3464-		
MEDINA	perf: 1020-26	perf: 3553-67 3580-90	perf: 3327-28	perf: 3576-77	perf: 3220-27			perf: 3513 3528, 3552-58		
QUEENSTON	3132-	3686-						3670-		
MIDDLE ORDOVICIAN LIMESTONES										
GATESBURG										
TOTAL DEPTH	3157	3722	3426	3656	3247	1942	1687	3676	12,039	7522
DEEPEST FORMATION REACHED	Queenston	Queenston	Medina	Medina	Medina	Base Island	Base Island	Queenston	Junata	Helderberg
RESULT	1300 Mcf AF 925 psi 72 hours	1235 Mcf AF 995 psi 48 hours	1200 Mcf AF 1020 psi 60 hours	375 Mcf AF 1000 psi 48 hours	979 Mcf AF 1000 psi	2500 Mcf gas and SW Abandoned	Completed as salt water supply well	1000 Mcf AF 1125 psi 72 hours	Show gas in Tuscarora Suspended	SW in Oriskany Abandoned

TABLE 11

MAP NUMBER	41	42	43	44	45	46	48	48	49	50
COUNTY	JEFFERSON	JEFFERSON	JEFFERSON	JEFFERSON	JEFFERSON	JEFFERSON	JEFFERSON	JEFFERSON	JEFFERSON	JEFFERSON
Permit Number	480	491	485	523	482	473	473	478	414	503
NAME OF WELL	Barin A. Hadlow 1	Elk Run Unit #2 R & P Coal #1	R & P Coal Co. (41056) 1	R & P Coal Co. (41076) 1	Alair & Kuntz 1	Donald Crossman 5	SS & W. Geesey 1	David Gould 1	Michael Harrick 1	Lindsay Coal Co. Tract 5 #1
OPERATOR	Consolidated Gas Supply Corp.	Consolidated Gas Supply Corp.	Consolidated Gas Supply Corp.	Consolidated Gas Supply Corp.	T. W. Phillips Gas & Oil Co.	J & J Enterprises 1	T. W. Phillips Gas & Oil Co.	J & J Enterprises 1	J & J Enterprises 1	Consolidated Gas Supply Corp.
TOWNSHIP	McClamont	Young	Young	Young	Perry	Perry	Perry	Perry	Young	Perry
QUADRANGLE	DuBois G 42	Punxautawney A 60	Punxautawney A 59	Punxautawney A 61	Snicksburg C 19	Snicksburg F 21	Snicksburg C 17	Snicksburg C 20	Snicksburg C 32	Snicksburg C 29
LATITUDE	4350 ft. N 4100'	5400 ft. S 4100'	13,500 ft. S 4100'	6900 ft. S 4100'	3700 ft. N 4055'	1300 ft. S 41055'	24,150 ft. S 41000'	2400 ft. N 40555'	22,100 ft. S 41000'	24,200 ft. S 41900'
LONGITUDE	2000 ft. W 79555'	11,100 ft. W 78555'	1000 ft. E 79500'	13,950 ft. W 78555'	8900 ft. E 79505'	14,200 ft. W 79500'	12,200 ft. W 79500'	13,100 ft. W 79500'	4600 ft. W 79500'	5700 ft. W 79500'
DATE COMPLETED	2-28-67	3-4-67	1-21-67	10-10-67	1-20-67	1-24-67	1-1-67	1-12-67	10-17-67	6-23-67
ELEVATION	1669 KB	1311 DF	1325 KB	1303 DF	1338 RT	1215 KB	1569 RT	1191 KB	1407 KB	1243 DF
TULLY	7056- GR		6440- GR	6529- GR	6497-6643 GR		6540- GR	6342-	6553-	6416-
DNONDAGA	7026- GR	7089- GR	7016- GR	7108- GR	7099- GR	7086- GR	7216- GR	6912- GR	7132- GR	7015- GR
CHERT		7108- GR	7036- GR	7126- GR	7120- GR	7105- GR	7234- GR	6931- GR	7146- GR	7041- GR
ORISKANY	7720-7744 GR	7187- GR	7118- GR	7206- GR	7204 GR	7191- GR	7319- GR	7015- GR	7233- GR	7120- GR
HELDERBERG	7744 -	7208- GR	7140- GR	7228 GR	7220- GR	7213- GR	7338- GR	7031- GR	7254- GR	7140- GR
SALINA										
GUELPH - LOCKPORT										
CLINTON										
MEDINA										
QUEENSTON										
TOTAL DEPTH	777 1/2	7238	7162	7255	7234	7239	7350	7061	7268	7171
DEEPEST FORMATION REACHED	Holderberg	Holderberg	Holderberg	Holderberg	Holderberg	Holderberg	Holderberg	Holderberg	Holderberg	Holderberg
RESULT	Dry in Ordovician PB 307F 223 MeqAF + SN 955 psi/16 days Abandoned	2300 Mcf gas Natural 2540 psi 24 hours	2112 Mcf gas AF 2195 psi 66 hours	5050 Mcf AF 2880 psi 7 days	4665 Mcf gas Natural 3100 psi in 2 hours	Salt water filled well to above Tully in 5 hours Abandoned	5200 Mcf gas Natural 3200 psi 49 hours	13,500 Mcf AF 3333 psi 42 hours	6000 Mcf AF 2361 psi 43 hours	15,160 Mcf AF 2361 psi 10 days

Table 11. — Summarized records of deep wells, Continued

MAP NUMBER	51	52	53	54	55	56	57	58	59	60
COUNTY	JEFFERSON 488	JEFFERSON 512	JEFFERSON 500	JEFFERSON 495	JEFFERSON 484	JEFFERSON 494	JEFFERSON 487	JEFFERSON 497	JEFFERSON 510	MERCER
NAME OF WELL	Lindsay Coal Co. Tract 8 #1	Lindsay Coal Co. 1	Lindsay Coal Co. (Gabrielson Unit)	Edwin McClure 1	Edward B. Means 1	C. K. Mohney 1	RE Postlewaite Tract 1 #4	Earl Powell 1	James E. Todd 3	V. Malinowski 1
OPERATOR	Consolidated Gas Supply Corp.	Consolidated Gas Supply Corp.	Fairman Drilling Co.	Fairman Drilling Co.	Fairman Drilling Co.	J & J Enterprises	T. M. Phillips Gas & Oil Co.	Consolidated Gas Supply Corp.	T. M. Phillips Gas & Oil Co.	H. C. Vandenberg, Jr.
TOWNSHIP	Young	Perry	Perry	Perry	Perry	Perry	Perry	Perry	Perry	Shenango
QUADRANGLE	Smickburg C 24	Smickburg C 30	Smickburg C 27	Smickburg C 25	Smickburg C 22	Smickburg C 28	Smickburg C 23	Smickburg C 26	Smickburg C 31	Neshannock A 3
LATITUDE	9900 ft. N 40°55'	25,000 ft. S 41°00'	24,750 ft. S 41°00'	15,700 ft. S 41°00'	2800 ft. N 40°55'	22,500 ft. S 41°00'	1500 ft. N 40°55'	19,800 ft. S 41°00'	18,800 ft. S 41°00'	1700 ft. N 41°10'
LONGITUDE	1300 ft. W 79°00'	10,000 ft. W 79°00'	8300 ft. W 79°00'	6250 ft. W 79°00'	4350 ft. W 79°00'	14,300 ft. W 79°00'	6200 ft. E 79°05'	8350 ft. W 79°00'	7500 ft. W 79°00'	700 ft. E 80°30'
DATE COMPLETED	2-15-67	8-6-67	5-13-67	3-21-67	1-27-67	3-7-67	2-21-67	4-26-67	7-13-67	7-8-67
ELEVATION	1250 DF	1312 DF	1452 FB	1522 HF	1374 FB	1630 FB	1348 RT	1593 DF	1586 KB	1051 FB
TULLY										
ONONOAGA	LIMESTONE									
CHERT	7020- GR	7017- OR	7136- OR	7190- OR	7106- OR	7355 -	7088- GR	7214- OR	7195-	
ORISKANY	7040- OR	7037- OR	7154- OR	7210- OR	7126- OR		7109- GR	7233- OR		
HELOERBERG	7120- OR Gas	7126- OR Gas	7238- OR Gas	7297- OR	7210- OR		7199- OR Gas	7320- OR Gas		
SALINA	7142- OR	7141- OR	7258- OR	7308- OR	7230- OR		7213- GR	7334- OR		
GUELPH - LOCKPORT										
CLINTON										
MEADINA										
QUEENSTON										
TOTAL DEPTH	7167	7171	7283	7335	7262	7530	7226	7364	7369	5320
DEEPEST FORMATION REACHED	Helderberg	Helderberg	Helderberg	Helderberg	Helderberg	Helderberg	Helderberg	Helderberg	Helderberg	Queenston
RESULT	4577 Mcf Natural 2803 psi 13 hours	1810 Mcf AP 2439 psi 10 days	7060 Mcf AP 2367 psi 43 hours	73 Mcf AP Abandoned	7983 Mcf AP 3077 psi 56 hours	Dry in Oriskany Plugged back to 3400 200 Mcf AP 275 psi 40 hours	5126 Mcf AP 3925 psi 18 hours	3723 Mcf AP 2848 psi 162 hours	93 and SW from Oriskany 4611 FB to 3435 83 Mcf AP 1859 psi 46 days	850 & O from Medina Abandoned

MAP NUMBER	61	62	63	64	65	66	67	68	
COUNTY	SQWERSET	TIOGA	WASHINGTON	WASHINGTON	WESTMORELAND	WESTMORELAND	WESTMORELAND	WYOMING	
Permit Number	37	170	164	508	20	5-P			
NAME OF WELL	T. E. Sipe 1	Pa. Dept. F & W Tract 136 No. 1	T. J. Koben 1	Wm. O. Anderson 1	Anna Kuhn 1	W. D. Clark 2A	High Ridge Water Supply Co. #1	E. Swittek 1	
OPERATOR	The Peoples Nat. Gas Co.	Parsons Brothers	Snee & Eberly et al	S. W. Jack Drilling Co.	Fairman Drilling Co.	T. W. Phillips Oil & Oil Co.	James Drilling Co.	Ohio Eastern Service, Inc.	
TOWNSHIP	Milford	Elk	E. Pike Run	Hanover	S. Huntingdon	St. Clair	St. Clair	Lemon	
QUADRANGLE	Meyersdale B 5	Galeton F 42	Brownsville D 1	Staebenville F 2	Connellsville D 6	Johnstown D 7	New Florence F 20	Tunkhannock E 1	
LATITUDE	10,000 ft. N 39°55'	27,400 ft. S 41°40'	26,900 ft. S 40°10'	17,600 ft. S 40°25'	4,500 ft. S 40°10'	11,650 ft. S 40°25'	14,600 ft. S 40°25'	4,900 ft. N 41°35'	
LONGITUDE	600 ft. E 79°10'	9000 ft. W 77°30'	4000 ft. W 79°55'	3750 ft. W 80°30'	600 ft. W 79°40'	18,650 ft. W 78°55'	1000 ft. W 79°00'	9100 ft. E 75°55'	
DATE COMPLETED	1-31-67	5-15-67	9-13-67	1-11-67	12-5-67	11-30-67	2-1-67	3-9-67	
ELEVATION	2067 KB	1874 DF	1041 KB	1062 G	1334 KB	2311 KB	2148 KB	1118 G	
TULLY	8044? - GR	5158 - GR	7255 -	5245 -	6926 -		6975 -		
ONONDAGA	8950 - GR	6062 - GR	7698 -	5438 -	7384 -		7730 -		
CHERT	8974 - GR		7717 -		7403 - Gas		7746 -		
ORISKANY	9082 - GR	6094 - GR	8050 -	5640 -	7583 - Gas		7854 -		
HELDERBERG		6110? - GR	8104 -	5708 -	7615 -		7896 -		
SALINA									
GUELPH - LOCKPORT									
CLINTON									
MEDINA									
QUEENSTON									
TOTAL DEPTH	9305	6128	8471	5895	7649	8215	7936	4999	
DEEPEST FORMATION REACHED	Shriver	Helderberg	Kayser	Helderberg	Helderberg	Hamilton?	Helderberg	Upper Devonian	
RESULT	16 Mc Abandoned AF	Dry Abandoned	Dry in Oriskany Gas in Gordon @ 2289 539 Mcf 1046 psi 8 days	Dry Abandoned	1104 Mcf AF 3650 psi 48 hours	Apparently did not reach Onondaga; Abandoned	150 Mcf AF 400 psi, 11 hours Abandoned	35 4QLO Abandoned	

Table 12. — Summarized records of deep wells drilled in Pa., 1966 (records received in 1967)

P NUMBER	CRAWFORD 207	CRAWFORD 208	CRAWFORD 206	ERIE 281	ERIE 279	ERIE 288	ERIE 286	ERIE 300	ERIE 285	ERIE 289	ERIE 310 P	ERIE 294 P
MUNITY Permit Number	O. Nelson 1	O. Neidand 1	L. R. Tinker 1	Bainbridge 1	Fisher 1	Gribble 1	R. & C. Leach 1	Macmillan 1	Newman 1	Hose 1	Terry 1	Welson (Waldron) 1
NAME OF WELL	Jones Drilling Corp.	Jones Drilling Corp.	Jones Drilling Corp.	Chemco, Inc.	Plato Corp.	Cayman Corp.	Cayman Corp.	Jones Drilling Corp.	Cayman Corp.	Cayman Corp.	V. H. Simmons	Cayman Corp.
GENERATOR	Jones Drilling Corp.	Jones Drilling Corp.	Jones Drilling Corp.	Elk Creek	Conseant	Springfield	Springfield	Conseant	E. Springfield Boro.	Springfield	Springfield	Springfield
WMSHP	Spring	Spring	Spring	Elk Creek	Conseant	Springfield	Springfield	Conseant	E. Springfield Boro.	Springfield	Springfield	Springfield
ADDRESS	Girard I 342	Girard B 340	Girard H 341	Girard F 335	Girard D 331	Girard A 320	Girard A 307	Girard D 326	Girard B 322	Girard A 296	Girard A 328	Girard A 321
DEPTH	20,150 ft. S 41,500'	19,300 ft. S 41,050'	19,150 ft. S 41,050'	18,600 ft. S 41,055'	8600 ft. S 41,055'	15,700 ft. S 42,000'	16,800 ft. S 42,000'	9200 ft. S 41,055'	14,550 ft. S 42,000'	15,800 ft. S 42,000'	22,400 ft. S 42,000'	21,100 ft. S 42,000'
DIRECTION	400 ft. E 80°20'	2750 ft. W 89°20'	1400 ft. W 89°20'	20,100 ft. W 89°15'	2000 ft. W 89°25'	2700 ft. W 89°25'	2700 ft. W 89°25'	4600 ft. W 89°30'	15,800 ft. W 89°20'	1500 ft. W 89°25'	15,500 ft. W 89°25'	11,600 ft. W 89°25'
DATE COMPLETED	12-31-66	12-15-66	12-24-66	12-8-66	11-1-66	11-11-66	9-14-66	11-19-66	8-30-66	8-19-66	9-12-66	11-18-66
ELEVATION	1245 G	1206 RT	1251 G	10401 G	894 G	753 G	750 G	915 G	779 KB	748 G	730 G	735 G
COMMENTS	2392-2436 GR	2340-	2392-	2185-	1870-	1590-	1598-	1849-	1628-	1590-	1614-	1610-
LOCATION	257A- GR	2510-	2568-	2185-	1870-	1590-	1598-	1849- Gas	1628-	1590-	1614-	1610-
STATUS	2770- GR SN 2774	SH @ 2740	SN 2756	2185-	SW	1854- Gas	1859- Gas	SN @ 2145	SN 1900-1916	1862- Gas	SN @ 1885	1859- SN @ 1862
ALPHA - LOCKPORT Black Water	2839- GR	3486- GR	3590	3486- GR	3590	3486- GR	3590	3486- GR	3590	3486- GR	3590	3486- GR
IRONDEQUOIT	3725- GR	3733-	3783	3355-	3088-	3070-	2800-	3070-	2800-	2800-	2800-	2800-
PERIOD	3830- GR perf: 3886, 3900-3904	perf: 3829, 3941	perf: 3884-3886, 3894	perf: 3445-3465	perf: 3193-3194	perf: 3166-3169	perf: 2861-2862, 2872-2897, 2926-2928	perf: 3166-3169	perf: 2861-2862, 2872-2897, 2926-2928	perf: 2870, 2880, 2907-2908, 2927-2928	perf: 2870, 2880, 2907-2908, 2927-2928	perf: 2870, 2880, 2907-2908, 2927-2928
RENTON	3950-	3950-	4000-	3300-	3300-	3300-	3300-	3300-	3300-	3300-	3300-	3300-
DOLE OROVICIAN LIMESTONES												
ATESBURG												
TOTAL DEPTH	3989	3991	4064	3568	3300	1027	1863	3277	3014	1865	3026	1864
PEDEST FORMATION REACHED	Power Glen	Quenston	Quenston	Quenston	Quenston	Oriskany	Oriskany	Quenston	Quenston?	Oriskany	Quenston	Oriskany
RESULT	1600 Mcf gas AF 1090 psi 48 hours	5000 Mcf gas AF 1090 psi 48 hours	1500 Mcf gas AF 975 psi 48 hours	5000 Mcf gas AF 1082 psi 48 hours	2000 Mcf gas AF 1020 psi 48 hours	5600 Mcf gas AF 715 psi 48 hours	3000 Mcf gas AF 780 psi 48 hours	1600 Mcf gas AF 865 psi 48 hours	970 Mcf gas AF 954 psi 1 week	4637 Mcf gas AF 795 psi 60 hours	P & A	P & A

